

REMARKS/ARGUMENTS

Claims 1, 4, 6, 7 and 15 are pending in this application. By this Amendment, Applicant amends Claims 1, 4 and 6, cancels Claims 2, 3, 5 and 8-14, and adds new Claim 15.

Claims 1-7 were rejected under 35 U.S.C. § 112, second paragraph, for allegedly being indefinite. Particularly, the Examiner alleged, "The term 'first coefficient of velocity-dispersion' which is noted as having a negative value, is not understood in the disclosure and hence the negative value of the 'velocity dispersion' in the claims is not understood. Such a term 'first coefficient of velocity-dispersion' has not been found in the prior art including worldwide databases. Thus, the Examiner requested that Applicant "provide some information on this and show how the negative value is reached."

The term "velocity dispersion," as used in the originally filed specification, means that the surface acoustic wave velocity is dependent upon the frequency. For instance, a negative value of the velocity dispersion means that as the frequency increases, the propagation speed (velocity) of the surface acoustic wave decreases. Thus, the term "velocity dispersion" means the velocity changes with respect to the frequency change. Contrary to the Examiner's allegations, the term "velocity dispersion" is a well-known term in the field of surface acoustic wave filters. The Examiner's attention is directed to U.S. Patent No. 5,189,330, which discusses velocity dispersion in a surface acoustic wave device.

In the present invention, the negative value for the velocity dispersion is achieved by providing the unique combination and arrangement of features recited in Claim 1, including the features of "the piezoelectric substrate is a crystal substrate," "the input-side IDT electrode and the output-side IDT electrode each include an electrode layer made of Al or an Al alloy defining a major electrode layer, and the electrode film thickness ratio h/λ is in the range of from about 0.035 to about 0.06, wherein h represents the film-thickness of the input-side IDT electrode and the output-side IDT electrode, and λ represents the wavelength of the surface acoustic wave" and "at least

one of the input-side IDT electrode and the output-side IDT electrode is an SPUDT electrode.”

Accordingly, Applicant respectfully submits that the meaning of the “velocity dispersion” is clear and definite, and respectfully requests reconsideration and withdrawal of this rejection.

Claims 1, 2 and 7 were rejected under 35 U.S.C. § 102(b) as being anticipated by, or, in the alternative, under 35 U.S.C. § 103(a) as being unpatentable over Sato (U.S. 4,340,834). Claims 1-3 and 7 were rejected under 35 U.S.C. § 102(e) as being anticipated by, or, in the alternative, under 35 U.S.C. § 103(a) as being unpatentable over Kadota et al. (U.S. 6,946,930). Claims 1 and 5 were rejected under 35 U.S.C. § 102(b) as being anticipated by, or, in the alternative, under 35 U.S.C. § 103(a) as being unpatentable over Nakamura et al. (US 2002/0056035). Claim 4 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Kadota et al. in view of Yoneda et al. (U.S. 6,271,617). Claim 6 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Sato in view of Oshio (U.S. 2004/0164645). Claims 2, 3 and 5 have been canceled. Applicant respectfully traverses the rejections of claim 1, 4, 6 and 7.

Claim 1 has been amended to recite:

A surface acoustic wave filter comprising:
a piezoelectric substrate; and
an input-side IDT electrode and an output-side IDT electrode
arranged on the piezoelectric substrate so as to be separated from each
other in the propagation direction of a surface acoustic wave; wherein
the piezoelectric substrate is a crystal substrate;
the input-side IDT electrode and the output-side IDT
electrode each include an electrode layer made of Al or an Al alloy
defining a major electrode layer, and the electrode film thickness
ratio h/λ is in the range of from about 0.035 to about 0.06, wherein h
represents the film-thickness of the input-side IDT electrode and the
output-side IDT electrode, and λ represents the wavelength of the
surface acoustic wave; and
at least one of the input-side IDT electrode and the
output-side IDT electrode is an SPUDT electrode. (emphasis added)

With the unique combination and arrangement of features recited in Applicant's Claim 1, Applicant has been able to provide a surface acoustic wave filter having a velocity dispersion that has a negative value, which produces a surface acoustic wave filter having an improved shape factor, a reduced size, and a narrow bandwidth (see, for example, the first full paragraph on page 3 and the first full paragraph on page 4 of the originally filed specification).

The Examiner alleged that each of Sato, Kadota et al. and Nakamura et al. teaches all of the features recited in Applicant's Claim 1.

Applicant's Claim 1 has been amended to recite the features of "the piezoelectric substrate is a crystal substrate," "the input-side IDT electrode and the output-side IDT electrode each include an electrode layer made of Al or an Al alloy defining a major electrode layer, and the electrode film thickness ratio h/λ is in the range of from about 0.035 to about 0.06, wherein h represents the film-thickness of the input-side IDT electrode and the output-side IDT electrode, and λ represents the wavelength of the surface acoustic wave" and "at least one of the input-side IDT electrode and the output-side IDT electrode is an SPUDT electrode." Claim 1, as amended, includes the features recited in originally filed Claims 2, 3 and 5.

As is clear from the various rejections of claims 1, 2, 3 and 5, none of Sato, Kadota et al. and Nakamura et al. teaches or suggests all of the features recited in Applicant's Claim 1, as amended herein. More specifically, none of Sato, Kadota et al. and Nakamura teaches or suggest the features of "the piezoelectric substrate is a crystal substrate," "the input-side IDT electrode and the output-side IDT electrode each include an electrode layer made of Al or an Al alloy defining a major electrode layer, and the electrode film thickness ratio h/λ is in the range of from about 0.035 to about 0.06, wherein h represents the film-thickness of the input-side IDT electrode and the output-side IDT electrode, and λ represents the wavelength of the surface acoustic wave" and "at least one of the input-side IDT electrode and the output-side IDT electrode is an SPUDT electrode" as recited in Applicant's Claim 1.

Accordingly, Applicant respectfully requests reconsideration and withdrawal of

the rejection of Claims 1, 2 and 7 under 35 U.S.C. § 102(b) as being anticipated by, or, in the alternative, under 35 U.S.C. § 103(a) as being unpatentable over Sato, the rejection of Claims 1-3 and 7 under 35 U.S.C. § 102(e) as being anticipated by, or, in the alternative, under 35 U.S.C. § 103(a) as being unpatentable over Kadota et al., and the rejection of Claims 1 and 5 under 35 U.S.C. § 102(b) as being anticipated by, or, in the alternative, under 35 U.S.C. § 103(a) as being unpatentable over Nakamura et al.

In anticipation of the Examiner possibly rejecting Claim 1, as amended, over the combination of Sato, Kadota et al. and Nakamura et al., Applicant respectfully submits that it would not have obvious to combine the teachings of these references to arrive at the invention recited in Applicant's Claim 1.

Particularly, Sato and Kadota et al. fail to teach or suggest anything at all about an SPUDT electrode, and certainly fail to teach or suggest that at least one of the input-side IDT electrode and the output-side IDT electrode of the surface acoustic wave devices disclosed therein could or should include an SPUDT electrode. Although Nakamura et al. broadly teaches an SPUDT electrode may be provided in a surface acoustic wave device, Nakamura et al. clearly fails to teach or suggest that such an SPUDT electrode could or should be used in a surface acoustic wave filter including a piezoelectric substrate that is a crystal substrate, or that an SPUDT electrode could or should be used in a surface acoustic wave filter having IDT electrodes that are made of Al or an Al alloy as a major electrode layer, and that have an electrode film thickness ratio h/λ is in the range of from about 0.035 to about 0.06.

Thus, Applicant respectfully submits that it would not have been obvious to combine the teachings of Sato, Kadota et al. and Nakamura et al. to arrive at the invention recited in Applicant's Claim 1.

The Examiner relied upon Yoneda et al. and Oshio to allegedly cure deficiencies of Kadota et al. and Sato. However, Yoneda et al. and Oshio clearly fail to teach or suggest the features of "the piezoelectric substrate is a crystal substrate," "the input-side IDT electrode and the output-side IDT electrode each include an electrode layer of Al or an Al alloy as a major electrode layer, and the electrode film thickness ratio h/λ is

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in the range of from about 0.035 to about 0.06, wherein h represents the film-thickness of the input-side IDT electrode and the output-side IDT electrode, and λ represents the wavelength of the surface acoustic wave" and "at least one of the input-side IDT electrode and the output-side IDT electrode is an SPUDT electrode" as recited in Applicant's Claim 1. Thus, Applicant respectfully submits that Yoneda et al. and Oshio fail to cure the deficiencies of Kadota et al. and Sato described above.

Accordingly, Applicant respectfully submits that Sato, Kadota et al., Nakamura et al., Yoneda et al. and Oshio, applied alone or in combination, fail to teach or suggest the unique combination and arrangement of elements recited in Applicant's Claim 1.

In view of the foregoing amendments and remarks, Applicant respectfully submits that Claim 1 is allowable. Claims 4, 6, 7 and 15 depend upon Claim 1, and are therefore allowable for at least the reasons that Claim 1 is allowable.

In view of the foregoing amendments and remarks, Applicant respectfully submits that this application is in condition for allowance. Favorable consideration and prompt allowance are solicited.

The Commissioner is authorized to charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-1353.

Respectfully submitted,

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